Comparative Analysis of Competition Power in High Technology and Low Technology Intensive Manufactures

¹Metin Yildirim, ²Ferda Nakipoğlu Özsoy
³Asst. Prof. Aslı Özpolat, ⁴Dr. Filiz Çayırağası

¹ Asst. Prof, Faculty of Economics & Administrative Sciences/Economics, University of Necmettin Erbakan, Turkey

² Asst. Prof, Faculty of Economics & Administrative Sciences/Economics, University of Gaziantep, Turkey

^{3,4} Oguzeli Vocational School of Higher Education, University of Gaziantep, Turkey

Abstract: An increase in competition power provides more profitability by affecting the amount of production and export. By the increase in technology, innovation and R&D investments in recent ages in the world, high technology industries became even more important for competitive power. In this study, two analyses covering the data from 1995 to 2015 have been considered. In the first analysis, the competitiveness of the high-tech and low-tech sectors has been compared by using RCA index for selected countries. In the second analysis, the relationship between competition power and growth, total factor productivity and R&D expenditures have been analyzed by using GMM.

Keywords: Competitive power, High technology-intensive manufactures, Low technology-intensive manufactures, RCA, GMM, Total factor productivity, Research and development expenditure

1. Introduction

There are two sources of economic growth: the first is the increase in the stock of production factors, and the other is the technological development. Although production factors such as labour and capital are increasing, technology is also advancing rapidly. Data for industrial production are categorised into four levels of technological development: high technology and low technology. Two technology groups are identified at the bottom of R&D intensity of economic activities such as R&D expenditure on value added (Jaegers et.al, 2013).

High technology includes the most advanced technology available and the latest technology. High-tech products not only new but also previously unconsidered products—offer technological solutions to customers' problems (Atmer and Thagesson, 2005:31). High-tech commodities are extremely diverse regarding their qualities and usability. Grouped by technological complexity at varying degrees, high-tech commodity companies need to utilise other basic skills and key competencies when designing, manufacturing and selling. They also cater to varied customers according to their purchasing and use conditions. The markets for high-tech products are the most dynamic emerging markets in the world, and their growth is mainly based on the development of information and technology (Wiechoczek, 2016:80-81). The high-tech category comprises the production of chemicals, general and specific aim machines, motor devices, computing machines, pharmacological products and electronic equipment (Liu and Daly, 2011:17).

Low-tech, traditional companies, are at the heart of the established system, which can be invested in through well-recognized market channels. Low-tech companies incur fewer costs for R&D, but their fixed costs are higher than those in the high technology sector because although their product features require a minimum level of technology development, they require more expensive raw materials compared to those of the high-tech sector (Atmer and Thageson, 2005:32). Low technology category contains production of leather and related products, food, rubber, plastic, wearing apparel, wooden, sheet and sheet product, furniture, printing and recording, refined petroleum, beverages, tobacco textiles coke and coke (Liu and Daly, 2011:17).

In the literature, many studies have shown that the biggest increase in real income per capita in industrialized countries is due to technological improvement. Know-how in technologically condensed activities is more important for economic growth. It is, therefore, each country should specialise in exports of high-tech goods.

High-tech exports contain all products with high investigation and development condensed, like medical products, computing machines, software, scholarly materials, electronic and other electrical equipment and components (Gani, 2009:31). Expertness in these high-tech goods is used to catch technology consistency of exports (Srholec, 2005:1). High-tech industries are major sources of employment growth, profit, and innovation in both products and processes (Kask and Sieber, 2002:16). Connolly (2003) emphasised the significance of imports in the transmission of technology. It is notably greater for developing countries than for advanced countries because third world countries are not very integrated with advanced nations. Furthermore, high-tech imports from advanced countries have a favourable impact on interior innovation and imitation. In addition, it has caused an increase in GDP growth by higher quality monetary fund goods are used in interior production. Gani (2009) has noted that to provide a strong witness of the favorable impact of high-tech exports on per capita growth in countries with higher degrees of technological progress.

The advance of the industry sector raises productivity, and the growth of the manufacturing industry can be possible only through export, which is why Kaldor (1968) considered the manufacturing industry to be growth's engine. Kaldor's Growth Laws are four laws relating to the causation of economic growth. First, an increase in the growth rate in the manufacturing sector brings about an increase in the growth rate in GDP. Second, the increased growth rate in manufacturing output causes an increase in the growth rate in labour productivity in the manufacturing sector, which causes increasing returns to scale. Third, demand in the agricultural sector determines the growth of manufacturing output in the early steps of development and exports in the later steps. Fourth, the increased growth rate in exports and output causes economic growth in the long term (Blecker, 2009, pp. 4–5).

According to Lucas (1988), countries can be grouped into two categories. The first group of countries produces high-tech goods, whereas the second group of countries focuses on low-tech goods. Lucas emphasized that the ratio between the human capital rate and substitutability rate of high-tech goods is statistically significant and higher than that of low-tech goods. The effect of the export of high-tech goods on growth will be more significant than the effect of the export of low-tech goods. Therefore, Lucas claimed that countries should specialize in exporting high-tech goods.

Chakrabarti (1991) emphasized that technology is a keystone in competitiveness. Technological development and growth play crucial roles in determining the competitiveness of the world marketplace. Cuaresma and Wörz (2005) are tested the effect of exports with distinct technologic context on economic growth for 45 developed and developing countries over the period 1981 to 1997. According to the result of the study, high-tech exports show the better performance than domestic sectors because of productivity differential for only

developing countries. The effect of exports has a significant difference on growth based on the technology consistency. Advantages of high-tech exports exceed the advantages of low-tech exports.

Cuneo and Mairesse (1984) examined the relationship between productivity and R&D for 182 firms between 1972 and 1977. The result of the study showed that the elasticity of R&D-performing firms is twice that of other firms. Griliches and Mairesse (1984) supported the results found by Cuneo and Mairesse. Harhoff's (1998) and Tsai and Wang's (2004) studies showed that the R&D elasticities of high-tech firms differ from those of other firms by analyzing different countries' firms within different periods. According to the results of the studies, the R&D elasticity of the high-tech sector is highest. As regards to the result of Verspagen's (1995) study of 15 manufacturing sectors in nine OECD countries, R&D has a positive and important impact on productivity in high-tech industries. Kafourous (2005) found similar results for UK manufacturing sectors. An R&D investment has a positive effect on high-tech sectors but no impact on low-tech sectors.

Because of the reasons above, the dynamic relationship between Competition Power, Total Factor Productivity, Growth, and Research and Development R&D expenditure has been analyzed in this study. In this scope, two models were used to compare differences between low-tech- and high-tech- intensive sectors. The models have been estimated using yearly data from 1995 to 2015 for 16 selected countries. To compare the differences between and the impact of the variables, the analysis has been constituted into two stages. At the first stage of the analysis, the competition power was calculated by us according to the revealed comparative advantage (RCA) method. At the second stage of the analysis, we used the generalised method of moments (GMM). In the models, competition powers, which we calculated according to the RCA method, are the dependent variables. The other variables are GDP, R&D expenditure, and total factor productivity (TFP).

2. Data and Empirical Analysis

The data included in the study cover the 1995–2015 annual series of the selected 15 OECD (Turkey, India, Korea, Japan, China, Germany, Belgium, Poland, Hungary, France, Austria, UK, Israel, Finland and Canada) countries. The relationship between high-tech export competitiveness and low-tech export competitiveness, growth rate, and productivity has been tested through the GMM. Within this scope, two different models have been created. Whereas the dependent variable in the first model is the high-technology exports' competitive power index, the second model is the low-technology exports' Competitive Power Index. In both models, the independent variables have been determined as National Income (GDP in 2005 U.S. dollars), R&D Expenditures, and TFP. We calculated the competition power indices, which are dependent variables, according to the RCA method. We derived the GDP and R&D from the World Bank and the TFP, which is used as a productivity indicator, from the Conference Board Total Economy Database. We used logarithmic variables in the study. Model 1 is expressed as:

(1)

HRCA: High Technology Competition Power Index

GDP: Gross Domestic Product

TFP: Total Factor Productivity

RD: Research and Development Expenditure

Model 2 is as follows:

(2)

LRCA: Low Technology Competition Power Index

GDP: Gross Domestic Product

TFP: Total Factor Productivity

RD: Research and Development Expenditure

We used two steps to analyse the relationship between competition power, growth rate, R&D expenditure, and TFP. For the first step, we calculated the RCA index according to Bela-Balassa. With this index, during the second step of the analysis, the relationship between the competition powers of high-technology- and low-technology-intensive sectors and GDP, TFP, and R&D was analysed using the generalised method of moments.

2.1 RCA Analysis

The RCA approach was developed and used by Balassa (1965). In this approach, countries are examined to determine the relative export performance of certain products. Developed by Balassa, this index is formulated as follows:

$$RCA_{ij} = (X_{ij}/X_{it}) / (X_{wj}/X_{wt}) \quad (3)$$

Where X_{ij} determines the exports goods j of country i , X_{it} is total exports of country i , X_{wj} is goods j exports of other countries, and X_{wt} determines the total exports of other countries. If the value of the index is more than one, it means that the country has a superiority in the field; if it is small, it means that the country lacks competitiveness in the production of that good. However, if the value of the index is less than one, the country has less competitiveness in the production of that product than others in the field. An index value of more than one means that the country has the advantage of the area covered, and

$RCA < 1 \Rightarrow$ the competitiveness of the country in j good has a comparative disadvantage;

$RCA > 1 \Rightarrow$ competitiveness of the country in j good has comparative advantage;

$RCA = 0 \Rightarrow$ country does not have j good exports.

Figure 1 shows the high-tech competition power (HRCA) and low-tech competition power (LRCA) indices for the countries selected between 1995 and 2015.

Figure 1: Competition Power Index for Selected Countries

The countries that hold the most important advantages in high-tech sectors are Japan, Korea, China, and Germany. These countries have a comparative advantage over other countries in both high- and low-technology sectors. Although Turkey and India, which are developing countries, concentrate on low technology, Korea seems to have a significant advantage against Turkey and India in both sectors. Although the export power of Japan declined over time in both areas, the powers of China, Germany, India, and Korea increased relative to all the countries evaluated. In Turkey, the competition power of high technology increased at a low rate over the period, whereas the competitiveness of the country's low-technology exports has increased, except the last two years. According to this result, Korea and Japan have more competition power in high-tech sectors than Turkey and India do. Among the countries, Turkey has the least competition power. Turkey's RCA index was 0.22 in 1995; in 2015, its RCA index was 0.38. Therefore, Turkey has no comparative advantage in the high-tech sector. However, in Germany and Japan, the RCA indexes were as follows, respectively: in 1995, 0.935 and 1.36 and 2015, 0.955 and 0.932. Even though each country's RCA index decreased in 2015, some countries still had comparative advantages against the other countries.

Table 1 also shows the results of the competition index of the other selected countries included in the analysis. Poland, Austria, and Finland have competitive advantages in low-technology-intensive sectors, whereas Israel and the United Kingdom have high competitiveness in high-technology-intensive sectors; Belgium, France, and Hungary have significant advantages in both sectors. As the level of human capital and technology of the firms has increased, the firms' competitiveness powers have also increased. The Israeli economy is based on the production of high-tech equipment, agriculture, industry, diamond processing, and tourism; Israel is a major player in the high-tech industry. For this reason, Israel's high-tech industry is a major growth engine. The United Kingdom is considered high tech in relation to other countries. The heart of the high-tech zone, known as "Silicon Fen," is in the United Kingdom, which is why the United Kingdom has an important advantage in high-tech sectors.

Table 1: Result of RCA Index for Countries

Year	Lrca	Poland Hrca
1995	2.250844448	0.403374808
1996	2.330123237	0.434572109
1997	1.862278607	0.467317777
1998	2.200165914	0.425432452
1999	2.194431963	0.382292041
2000	2.251564624	0.416603447
2001	2.489939035	0.410535259
2002	2.444693078	0.419876708
2003	2.264793265	0.430107643
2004	2.070259276	0.413076422
2005	1.844000485	0.433577041
2006	1.767419566	0.489146548
2007	1.729177632	0.53667222
2008	1.662185737	0.642722398
2009	1.512219603	0.67626436
2010	1.458598312	0.733965458
2011	1.669798406	0.696803851
2012	1.703397856	0.70792466
2013	1.795145061	0.708326583

Metin Yildirim, Ferda Nakipoğlu Özsoy, Ash Özpolat, Filiz Çayırağasi
Comparative Analysis of Competition Power in High Technology and Low Technology Intensive Manufactures

2014	1.708670067	0.712417328
2015	1.638105019	0.680439838
		Hungary
Year	Lrca	Hrca
1995	1.021420682	0.642965825
1996	1.137607535	0.565277791
1997	0.801962043	0.864734121
1998	0.749890503	0.888821473
1999	0.760476708	0.940189117
2000	0.757222422	1.077176923
2001	0.757195349	0.997454011
2002	0.70367339	1.045874773
2003	0.676975087	1.128112141
2004	0.67520022	1.261439949
2005	0.658748883	1.206308154
2006	0.656990817	1.185276205
2007	0.616572706	1.172467278
2008	0.620599038	1.2694737
2009	0.542620833	1.317282096
2010	0.57334939	1.341514748
2011	0.634068084	1.315312323
2012	0.683854618	1.178801542
2013	0.756762724	1.105508551
2014	0.736774431	0.974481958
2015	0.696859861	0.867695151
		France
Year	Lrca	Hrca
1995	1.071126925	1.047172472
1996	1.111028652	1.124724217
1997	1.065445759	1.074780195
1998	1.031658316	1.057673483
1999	1.067304369	1.052098314
2000	1.167190711	1.109935119
2001	1.131749479	1.113137289
2002	1.112366754	1.075378347
2003	1.139888454	1.056295317
2004	1.045147139	1.060815321
2005	1.08837461	1.095909367
2006	1.10405806	1.131578212
2007	1.111521778	1.136880002
2008	1.059632698	1.227132873
2009	1.051136083	1.227794654
2010	1.05523464	1.28138081
2011	0.986209435	1.329856686
2012	1.009075279	1.374841146
2013	1.045198612	1.389279384
2014	0.996141326	1.351849755
2015	1.133366316	1.428608329
		Austria

Metin Yildirim, Ferda Nakipoğlu Özsoy, Ash Özpolat, Filiz Çayırağasi
Comparative Analysis of Competition Power in High Technology and Low Technology Intensive Manufactures

Year	Lrca	Hrca
1995	1.734643493	0.547156715
1996	1.68873337	0.548737718
1997	1.660657639	0.608019213
1998	1.792896715	0.58896959
1999	1.761062361	0.584214398
2000	1.707435372	0.598993776
2001	1.673206028	0.605648224
2002	1.645760201	0.635449421
2003	1.75727681	0.654677833
2004	1.630562462	0.663133129
2005	1.687766865	0.627404848
2006	1.701254712	0.645004273
2007	1.756770635	0.674418464
2008	1.776987207	0.704286811
2009	1.776045271	0.720239035
2010	1.803764662	0.729091061
2011	1.879978901	0.754687196
2012	1.945980386	0.785139464
2013	2.055410148	0.817002615
2014	2.048318542	0.804251199
2015	1.948489476	0.736182996
		UK
Year	Lrca	Hrca
1995	0.860963355	1.396870297
1996	0.865232957	1.38493557
1997	0.860102475	1.334624034
1998	0.791125389	1.336494631
1999	0.787647567	1.302096875
2000	0.743549235	1.179183328
2001	0.743689598	1.247395631
2002	0.723637375	1.251113148
2003	0.772051187	1.180282272
2004	0.796150841	1.125689939
2005	0.80099943	1.201062754
2006	0.739455506	1.380022564
2007	0.834015917	1.085239738
2008	0.777237255	1.098516079
2009	0.736407994	1.024267921
2010	0.702356408	1.092592883
2011	0.640265927	1.02707827
2012	0.671307933	1.067524085
2013	0.662311696	0.898411995
2014	0.734668912	1.09563909
2015	0.651235827	1.121043751
		Israel
Year	Lrca	Hrca
1995	0.443223545	1.272787716

Metin Yildirim, Ferda Nakipoğlu Özsoy, Aşlı Özpolat, Filiz Çayırağası
Comparative Analysis of Competition Power in High Technology and Low Technology Intensive Manufactures

1996	0.503480477	1.335449993
1997	0.518557312	1.38531785
1998	0.508697648	1.397415717
1999	0.482125361	1.36626767
2000	0.505981939	1.045594052
2001	0.505665301	1.061192136
2002	0.422561531	0.971485718
2003	0.405471213	1.034012203
2004	0.387042157	1.024854429
2005	0.445736058	0.972472728
2006	0.498893726	1.046834673
2007	0.4258455	0.897668675
2008	0.512520014	1.636094294
2009	0.443768182	1.801373487
2010	0.435758691	1.704484766
2011	0.437007534	1.754540525
2012	0.420618371	1.77294172
2013	0.404577884	1.812899683
2014	0.451043627	1.690696262
2015	0.433963272	1.664566934
		Finland
Year	Lrca	Hrca
1995	1.499966725	0.739713642
1996	1.67853967	0.789186482
1997	1.361785299	0.857017905
1998	1.328077543	0.917730236
1999	1.336050363	0.956541742
2000	1.352121547	1.052850612
2001	1.569067863	0.97488358
2002	1.492698158	0.983165189
2003	1.677675306	0.980077993
2004	1.614392404	0.926280214
2005	1.447673873	1.066962892
2006	1.626341395	0.948036861
2007	1.641563984	0.934197433
2008	1.435029339	1.002518604
2009	1.315674648	0.77523809
2010	1.764980578	0.764125999
2011	1.659364284	0.74223262
2012	1.560188283	0.718710448
2013	1.610847885	0.66188151
2014	1.436423004	0.598323853
2015	1.408025577	0.520392364
		Canada
Year	Lrca	Hrca
1995	0.566743835	0.5585329
1996	0.624579455	0.561906513
1997	0.619560768	0.552447796

1998	0.663238567	0.543034293
1999	0.656410946	0.51166225
2000	0.614608713	0.574692034
2001	0.586707185	0.534719139
2002	0.626107354	0.49687346
2003	0.572941386	0.504482426
2004	0.551604345	0.504642774
2005	0.548503973	0.526219125
2006	0.55360959	0.548218658
2007	0.526199291	0.594221731
2008	0.525611155	0.599766688
2009	0.503609608	0.630269436
2010	0.510802664	0.574725106
2011	0.472021828	0.591987006
2012	0.514554257	0.560489458
2013	0.500996933	0.550422556
2014	0.494765303	0.530140015
2015	0.521867079	0.556812569
		Belgium
Year	Lrca	Hrca
1995	1.051218922	0.792435493
1996	1.018590245	0.812730353
1997	1.040229507	0.835940696
1998	1.038532963	0.842898757
1999	1.055998816	0.880376453
2000	1.121916331	0.908028161
2001	1.041662488	0.948458457
2002	0.976663714	1.080634886
2003	0.976484599	1.125653238
2004	1.026233683	1.12966232
2005	1.0724858	1.175573823
2006	1.118845083	1.166531693
2007	1.156301462	1.227027406
2008	1.138862175	1.270958871
2009	1.007883675	1.3181679
2010	1.01495363	1.304634266
2011	1.057924659	1.297872858
2012	1.016295179	1.303254975
2013	0.991533481	1.279903828
2014	1.018760751	1.250573071
2015	1.009703638	1.213333761

2.2 GMM Analysis

In the second phase of the study, the generated models will be analysed by the GMM. The OLS estimator and the GLS estimator sometimes produce deviations in estimates of dynamic panel data sets; for this reason, Arrellano and Bond (1991) developed a more effective method: the GMM. In this method, dynamic panel data analyses use the past period value of the dependent variable as the instrumental variable, taking the differences of the variables in the first order (Baltagi, 2001:130-131).

Arellano and Bond's (1991) GMM is either one staged or two staged. In the one-stage model, the error is not serially correlated and has homoscedastic features. Descriptive variables are not correlated. The one-stage model is expressed as follows:

$$\hat{\delta}_1 = \left[(\Delta y_{-1})' W (W' (I_N \times G) W)^{-1} W' (\Delta y_{-1}) \right]^{-1} \quad (4)$$

$$x \left[(\Delta y_{-1})^{-1} W (W' (I_N \times G) W)^{-1} W' (\Delta y) \right]$$

If the error term is heteroscedastic, a two-stage GMM estimator is more appropriate than the one-stage. In the first step of the two-stage estimation, the error terms are assumed to be homoscedastic to time with independent and explanatory variables. The two-stage GMM is formulated as follows:

$$\hat{\delta}_2 = \left[(\Delta y_{-1})' W V_N W' (\Delta y_{-1}) \right]^{-1} \left[(\Delta y_{-1})' W V_N^{-1} W' (\Delta y) \right] \quad (5)$$

This GMM estimator does not require knowledge of the first stage; in other words, its and distributions. GMM analysis is popular because it does not produce problems of autocorrelation and heteroscedasticity. The analysis results obtained within the scope of the study are given in Table 2.

Table 2: Results of Analysis

Variables	Model 1	Model 2
TFP	0.00310**	0.00658**
RD	0.0427***	0.01902
GDP	0.0056***	0.0044**
J-statistics	12.94046	11.28504
J-statistic Prob.	0.373383	0.504661

*, **, *** are refer that probability respectively; %10, %5, %1

After obtaining and evaluating the results, we tested the validity of instrumental variables for all models. According to this testing's results, J-statistics implies that the instrumental variables are significant and the null hypothesis is accepted.

According to the results in Model 1, there is a positive and significant relationship between the competitiveness, productivity, growth rate, and R&D expenditures of the sectors with advanced technology. Considering the statistically meaningful results, a 1% increase in TFP increases competitive power by 0.003%. Similarly, a 1% increase in R&D and growth create a 0.04% increase in competition power.

Considering the statistical results of Model 2, there is a positive and significant relationship between the competitiveness, growth, and productivity of low-tech-intensive sectors, but there is no significant relationship between R&D expenditures and competitiveness. Accordingly, a 1% increase in TFP brings a 0.006% increase in competition power and an increase of 1% in growth leads to a 0.004% increase in competition power. The level of significance of the variables in Model 1 shows that the relation between high-tech competition power, growth, productivity, and R&D expenditure is higher than those of the low-tech sectors. Additionally, growth, productivity, and R&D expenditures impact high-tech competition power more significantly than low-tech competition power. The results of our R&D expenditure analysis are consistent with the results of the studies of Kafourous (2005), Verspagen (1995), Harhoff (1998), and Tsai and Wang (2004).

3. Conclusion

The purpose of this paper is to investigate the relationship between competition power, GDP Growth Rate, R&D Expenditure and productivity on low-tech and high tech manufacturing in the OECD countries.

From the analysis, this research concludes findings as below:

1. The data included in the study cover the 1995–2015 annual series of the selected 15 OECD (Turkey, India, Korea, Japan, China, Germany, Belgium, Poland, Hungary, France, Austria, UK, Israeli Finland and Canada) countries.
2. The relationship between high-tech export competitiveness and low-tech export competitiveness, growth rate, and productivity has been tested through the GMM.
3. We calculated the competition power indices, which are dependent variables, according to the RCA method.
4. According to RCA index data calculated of the low-tech- and high-tech-intensive competitiveness of the countries, a competitiveness advantage in the low-technology sector is in Poland, Austria, and Finland, whereas Israel and the United Kingdom have high competitive advantages among the high-tech-intensive sectors. Also, Belgium, France, and Hungary have significant advantages in both sectors.
5. In the second phase of the study, we conducted a GMM analysis. Two different models have been created. Whereas the dependent variable in the first model is the high-technology exports' competitive power index, the second model is the low-technology exports' competitive power index. In both models, the independent variables have been determined as GDP in 2005 U.S. dollars, R&D expenditures, and TFP.
6. According to the results obtained, the effects of growth, productivity, and R&D expenditures on a high-tech competition power are positive and significant.

High-tech commodities are various regarding their qualities and usability; high-tech products add great value when compared to other products. These companies, which can be grouped by technological complexity, need to use other basic skills and key competencies when designing, manufacturing and selling their products. High-technology production is directly related to education, research, and innovation; creates positive externality; and increases productivity and human capital quality. Also, their high-tech companies' growth is mainly based on the development of information and technology. Moreover, emphasising these products in the field of exports will also cause countries to have a comparative advantage in the foreign market.

Although the relationship between growth, productivity, and low-tech competition power is positive and meaningful, the relationship between these factors and R&D expenditures is not significant. Low-tech-intensive sectors are based on established technology. Low-tech companies incur fewer costs for research and development, but their fixed costs are higher than those in the high-technology-intensive sectors because product features require the minimum level of technology development, unlike the high-tech sector.

References

- Abdul Ahad Riki, Mahendra Putra Kurnia, Erna Susanti, "Tinjauan Hukum terhadap Pelaksanaan Perlindungan Hukum Terhadap Tenaga Kerja Harian Lepas (Studi pada CV. Dwijaya Bhakti Rayon Kabupaten Penajam Paser Utara)", Jurnal Beraja Niti, ISSN 2337-4608, volume 3 Nomor 2(2014).
- Agusmidah, 2011, Dilematika Hukum Ketenagakerjaan, Tinjauan Politik Hukum, Jakarta: PT. Sofmedia.
- Christina NM Tobing, "Rekonstruksi Perjanjian Kerja Harian Lepas dalam Hukum Ketenagakerjaan Berbasis Keadilan", Disertasi, Fakultas Hukum Universitas Islam Sultan Agung (Unisula), Semarang, 2016 hlm. 2016.

- Gerry Silaban dan Salomo Perangin-angin, 2008, Hak dan Atau Kewajiban Tenaga Kerja dan Pengusaha/Pengurus yang Ditetapkan Dalam Peraturan Perundangan Keselamatan dan Kesehatan Kerja, Medan: USU Press.
- <http://hukum.studentjournal.ub.ac.id/index.php/hukum/article/viewFile/504/4/493>
<http://ojs.unud.ac.id/index.php/kerthasemaya/article/download/21911/14540>
- Imam soepomo, 1974, Hukum Perburuhan Bidang Hubungan Kerja, Cet. II, Djembatan, Jakarta.
- Materi Pelatihan Hakim Pengadilan Hubungan Industrial, Kurikulum untuk Hakim Pengadilan Hubungan Industrial, Mahkamah Agung RI dan ILO, Mega Mendung-Bogor, Maret 2013,
- Persen Pekerja Sawit Berstatus Buruh Lepas, dalam:
- <https://www.jurnalasia.com/bisnis/agribisnis/70-persen-pekerja-sawit-berstatus-buruh-lepas/>
- Susi Hadiyati dan Adi Cilik Pierewan, <http://www.e-jurnal.com/2016/02/strategi-bertahan-hidup-buruh-harian.html>
- Schclarek, A. (2004). Debt and economic growth in developing and industrial countries. Lund University Department of Economics Working Paper, 2005, 34.
- Stephen N. 2014, Ghana's debt distress threatens economic livelihoods of its citizens. <http://www.ghanaweb.com/GhanaHomePage/features/columnist>.